

What is claimed is:

1. A position sensing device comprising:
a substrate;

5 a first portion and a second portion wherein said first portion is attached to said substrate and wherein said second portion is movably mounted to said first portion along a first axis;

a two-dimensional photosensor array attached to said second portion;

10 a light path extending between a plane and said two-dimensional photosensor array; and

a lens positioned in said light path.

2. The device of claim 1 wherein said second portion is movably mounted to said first portion along said first axis and a second axis wherein said first axis is substantially perpendicular to said second axis.

3. The device of claim 2 wherein said second portion is further movably mounted to said first portion along a third axis wherein said third axis is substantially normal to a plane defined by said first axis and said second axis.

4. The device of claim 1 wherein said position sensing device is associated with a scanning device.

5. The device of claim 1 wherein said first portion is a control portion of an actuator mechanism and wherein said second portion is an actuating portion of said actuator mechanism.

6. The device of claim 1 wherein said lens is operationally associated with said second portion.

7. The device of claim 1 wherein said two-dimensional photosensor array comprises a two-dimensional array of photodetector elements.

8. The device of claim 7 wherein said two-dimensional array of photodetectors has between ten and twenty rows of photodetector elements.

9. The device of claim 7 wherein said two-dimensional array of photodetectors has between ten and twenty columns of photodetector elements.

10. A position sensing device comprising:

a substrate;

a two-dimensional photosensor array attached to said substrate;

5 a light path extending between said two-dimensional photosensor array and a plane;

a first portion and a second portion wherein said first portion is attached to said substrate and wherein said second portion is movably mounted to said first portion along a first axis;

10

a lens attached to said second portion and positioned in said light path.

11. The device of claim 10 wherein said second portion is movably mounted to said first portion along said first axis and a second axis wherein said first axis is substantially perpendicular to said second axis.

12. The device of claim 11 wherein said second portion is further movably mounted to said first portion along a third axis wherein said third axis is substantially normal to a plane defined by said first axis and said second axis.

5

13. The device of claim 10 wherein said position sensing device is operationally associated with a scanning device.

14. The device of claim 10 wherein said first portion is a control portion of an actuator mechanism and wherein said second portion is an actuating portion of an actuator mechanism.

15. A method of determining the position of an object relative to a surface, said method comprising:
providing a two-dimensional photosensor array
movably associated with said object;

5 directing light from a focal plane portion of said surface to said two-dimensional photosensor array;

causing relative movement between said surface and said object;

10 maintaining a light path between said focal plane portion of said surface and said two-dimensional photosensor array by moving said two-dimensional photosensor array; and

15 performing an analysis of said movement of said two-dimensional photosensor array to determine the displacement of said object relative to said surface.

16. The method of claim 15 further comprising generating image data representative of said focal plane portion of said surface with said two-dimensional photosensor array, wherein said performing an analysis
5 comprises performing an analysis of said movement of said two-dimensional photosensor array and said image data to determine the displacement of said object relative to said surface.

17. The method of claim 15 further comprising providing a lens between said two-dimensional photosensor array and said focal plane portion of said surface.

18. The method of claim 17 further comprising moving said lens proportional to said movement of said two-dimensional photosensor array.

19. A method of determining the position of an object relative to a surface, said method comprising:

providing a two-dimensional photosensor array associated with said object;

5 providing a lens associated with said object;

directing light from a focal plane portion of said surface, through said lens, and onto said two-dimensional photosensor array;

10 causing relative movement between said surface and object;

maintaining a light path between said focal plane portion of said surface and said two-dimensional photosensor array by moving said lens relative to two-dimensional photosensor array; and

15 performing an analysis of said movement of said lens relative to said two-dimensional photosensor array to determine the displacement of said object relative to said surface.

20. The method of claim 19 further comprising generating image data representative of said focal plane portion of said surface with said two-dimensional photosensor array, wherein said performing an analysis
5 comprises performing an analysis of said movement of said lens relative to said two-dimensional photosensor array and said image data to determine the displacement of said object relative to said surface.

21. The method of claim 19 wherein said providing a two-dimensional photosensor array comprises providing a two-dimensional photosensor array fixedly associated with said object.

22. The method of claim 19 wherein said providing a lens comprises providing a lens fixedly associated with said object.

23. A position sensing device for determining the position of an object relative to a surface, said device comprising:

a substrate associated with said object;

5 a photodetector means associated with said substrate for converting an image of a two-dimensional portion of a surface to machine-readable data;

a light path extending between a planar portion of said surface and said photodetector means; and

10 a means for moving said photodetector means relative to said substrate to maintain said light path between said planar portion of said surface and said photodetector means as said object is moved relative to said surface.